DIVISION 16 – ELECTRICAL

SECTION 16055

PIPE HEAT TRACING AND INSULATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Section includes requirements for electric heat tracing and insulation of process piping to prevent freeze up.

B. Furnish and Install a complete UL Listed, system of heating cables, components, and controls to prevent pipes from freezing. Insulate pipes as specified and as shown to reduce heat loss.

PART 2 - MATERIAL

2.1 HEATING CABLE

A. The self-regulating heating cable shall consist of two (2) 16 AWG nickel-copper bus wires embedded in parallel in a self-regulating polymer core that varies its power output to respond to temperature all along its length, allowing the heating cable to be cut to length in the field. The heating cable shall be covered by a radiation-crosslinked, modified polyolefin dielectric jacket. To provide a ground path and to enhance the heating cable's ruggedness, the heating cable shall have a braid of tinned copper and an outer jacket of fluoropolymer.

B. In order to prevent overheating, the heating cable shall have a self-regulating factor of at least 90 percent. The self-regulation factor is defined as the percentage reduction, without thermostatic control, of the heating cable output going from 40°F pipe temperature operation to 150°F pipe temperature operation.

C. The heating cable shall operate on a line voltage of: 120VAC without the use of transformers.

D. The heating cable for metal-pipe freeze protection shall be sized according to the table below. The required heating cable output rating is in watts per foot at 50°F.

Minimum Ambient Temperature		
Pipe size (inches)	0°F	–20°F
3 or less	5 watts	5 watts
4	5 watts	8 watts
6	8 watts	8 watts
8	8 watts	2 strips–5 watts
10	2 strips–5 watts	2 strips–8 watts

E. The heating cable shall be XL-Trace by Raychem Corporation, SRL by Chromalox or equal.

F. Power connection, end seal, splice, and tee kit components shall be applied in the field.

G. Heating cable circuit shall be protected by a ground-fault device for equipment protection

2.2 HEATING COMPONENTS

A. General: All heating-cable components shall be UL Listed, for use as part of the system to provide pipe freeze protection. Component enclosures shall be rated NEMA 4X to prevent water ingress and corrosion. Installation shall not require the installing contractor to cut into the heating-cable core to expose the bus wires. Connection systems that require the installing contractor to strip the bus wires or that us crimps or terminal blocks, shall not be acceptable. All components that make an electrical connection shall be reenterable for servicing. Components shall be equal to Chomalox DL series.

2.3 HEATING CONTROLS

A. Thermostats

1. The heat tracing control shall be by adjustable ambient sensing line voltage thermostat equal to Chromalox RTAS.

2. Freeze alarm protection shall be provided by a bulb and capillary pipe temperature sensing thermostat equal to Chromalox RTBC.

2.4 INSULATION

Insulation shall be 1" thick flexible elastomeric cellular insulation in accordance with ASTM C 534, Grade 1, Type I or II. Type II shall have vapor retarder/vapor barrier skin on one or both sides of the insulation. Insulation with pre-applied adhesive shall not be used.

2.5 JACKET

Insulation jackets shall be smooth sheet aluminum, 0.406 mm 0.016 inch nominal thickness; ASTM B 209M ASTM B 209, Temper H14, Temper H16, Alloy 3003, 5005, or 3105. Aluminum jacket securing bands shall be Type 304 stainless steel, 0.396 mm 0.015 inch thick, 13 mm 1/2 inch wide for pipe under 300 mm 12 inch diameter and 19 mm 3/4 inch wide for pipe over 300 mm 12 inch and larger diameter. Aluminum jacket circumferential seam bands shall be 50.8 by 0.406 mm 2 by 0.016 inch aluminum matching jacket material. stainless steel, or fiberglass reinforced tape. The jacket may, at the option of the Contractor, be provided with a factory fabricated Pittsburg or "Z" type longitudinal joint. When the "Z" joint is used, the bands at the circumferential joints shall be designed by the manufacturer to seal the joints and hold the jacket in place.

PART 3 - EXECUTION

3.1 HEATING CABLE

A. System shall be installed per the manufacturer's written recommendations. Heating cable shall be attached to pipes on maximum one-foot intervals. Heating cable shall be installed such that all in-line devices and equipment may be easily removed and reinstalled without cutting the heating cable. Cable shall be installed on the lower quadrant of horizontal pipe whenever possible to avoid mechanical damage and cable shall be located on the outside radius of all 45° and 90° pipe elbows.

B. Apply the heating cable linearly or in a spiral pattern on the pipe after piping has been successfully pressure-tested. Secure the heating cable to piping with cable ties or fiberglass tape.

C. Apply "Electric Traced" labels to the outside of the thermal insulation.

D. Tests:
After installation and before and after installing the thermal insulation, subject heating cable to testing using a 2500-Vdc Megger, Minimum insulation resistance shall be 20 megohms or greater.

3.2 INSULATION

A. General
Material shall be installed in accordance with the manufacturer's written instructions. Insulation materials shall not be applied until tests and heat tracing are completed. Material such as rust, scale, dirt and moisture shall be removed from surfaces to receive insulation. Insulation shall be kept clean and dry. Insulation shall not be removed from its shipping containers until the day it is ready to use and shall be returned to like containers or equally protected from dirt and moisture at the end of each workday. Insulation that becomes dirty shall be thoroughly cleaned prior to use. If insulation

becomes wet or if cleaning does not restore the surfaces to like new condition, the insulation will be rejected, and shall be immediately removed from the jobsite. Joints shall be staggered on multi layer insulation.

B. Installation

Flexible elastomeric cellular insulation shall be installed with seams and joints sealed with rubberized contact adhesive. Seams shall be staggered when applying multiple layers of insulation. A brush coating of adhesive shall be applied to both butt ends to be joined and to both slit surfaces to be sealed. The adhesive shall be allowed to set until dry to touch but tacky under slight pressure before joining the surfaces. Insulation seals at seams and joints shall not be capable of being pulled apart one hour after application. Insulation that can be pulled apart one hour after installation shall be replaced.

END OF SECTION